Material Control and Accountability (MC&A)

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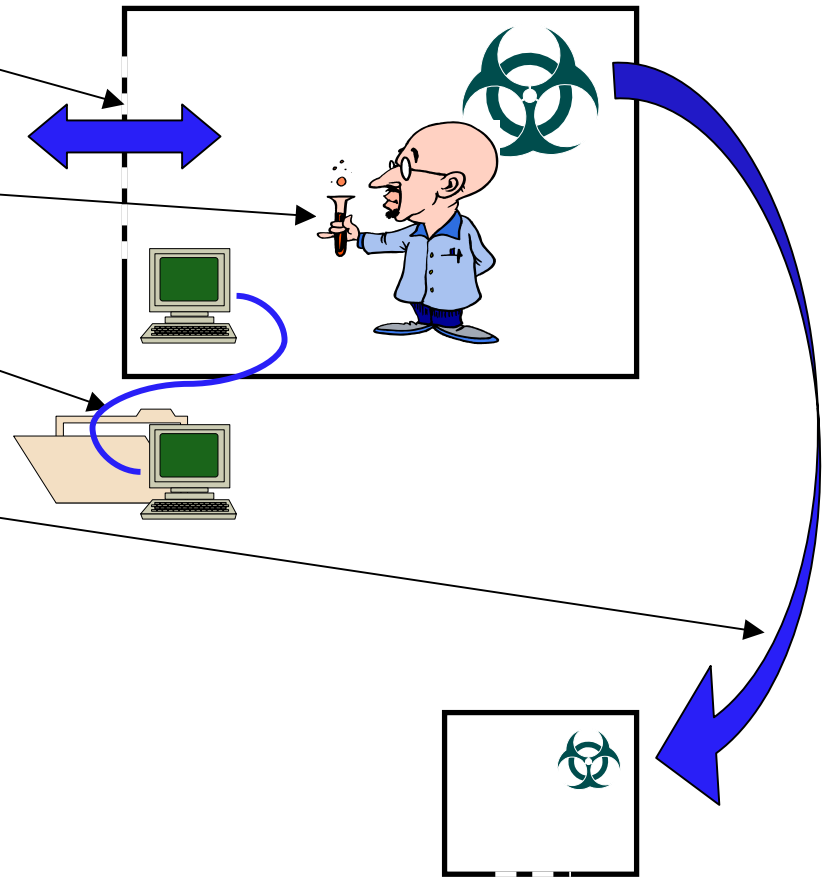
Outline

- Overview
  - Context
  - Objective
  - *Not* Accountancy
- Material
- Control
- Accountability
- Benefits & Challenges
- Summary

Material Control and Accountability complements other aspects of biosecurity.

- Physical security
- Personnel security
- Information security
- Transfer security



If these other measures were 100% effective, we wouldn't need MC&A.

But they are <u>not</u> 100% effective.

The objective of material control and accountability is…

…to assure the complete and timely knowledge of

- **What materials exist**
- **Where the materials are**
- **Who has access to them**

Material control and accountability should *not* be…

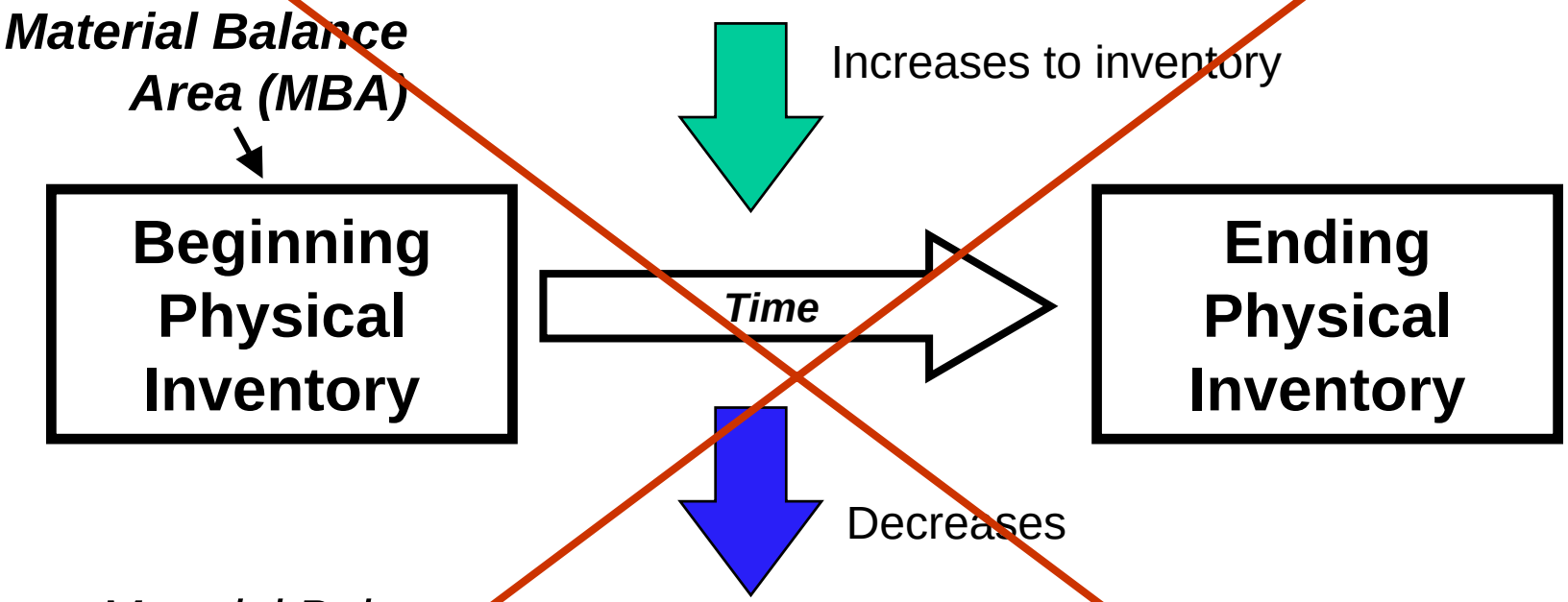
- A needless way to make valuable research difficult
- Nuclear safeguards applied mindlessly to biological materials
- Material balance accountancy

The "A" in biosecurity MC&A

does <u>not</u> mean

"Accountancy"

Accountancy seeks to verify the "material balance" for a "material balance area."



Material Balance:

(Beginning Inventory) + (In) - (Out) = (Ending Inventory)

But it's not perfect:

the difference is termed "Material Unaccounted For" (MUF)

MUF = (Beginning Inventory) + (In) - (Out) - (Ending Inventory)

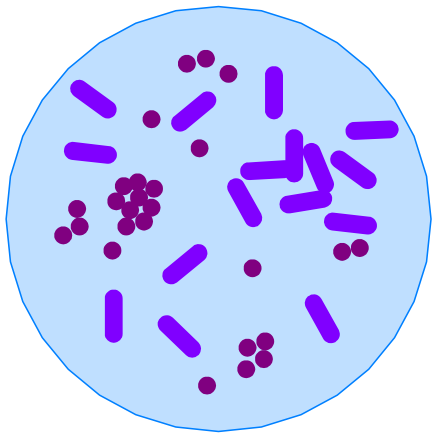
The principal issues for material control and accountability involve defining precisely:

- What materials are subject to MC&A measures
- The operating procedures associated with the materials
  - where they can be stored and used
  - how they are identified
  - how inventory is maintained
- What records need to be kept for those materials and the timeliness requirements for those records
- What accountability means
- Documentation and reporting requirements

Material Control and Accountability

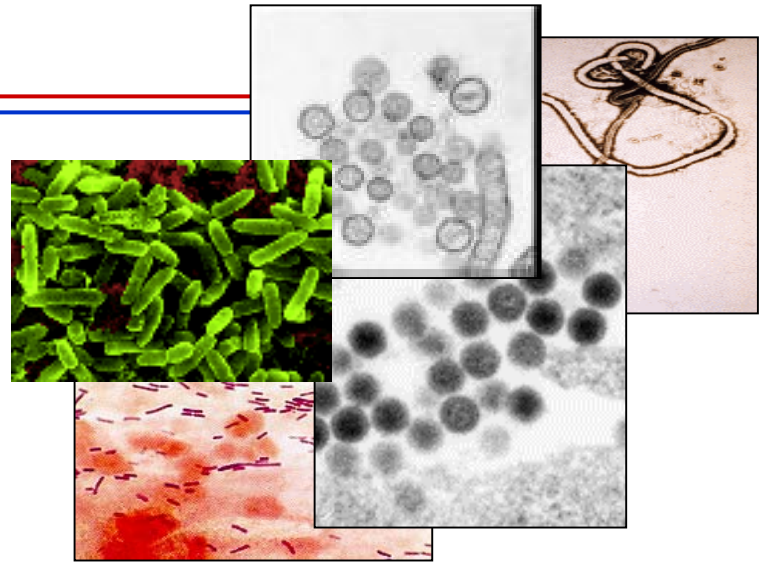
What **do we mean by "material"?**

- **High Consequence Pathogens and Toxins (HCPTs)**



- **MC&A deals directly with the primary asset we are trying to protect: the biological organisms.**

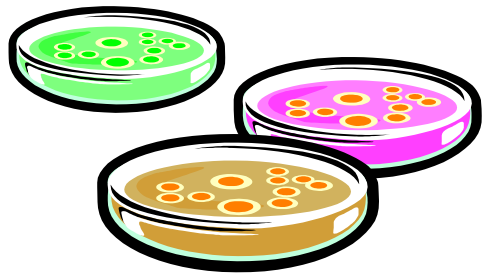
Defining "material" is complicated.



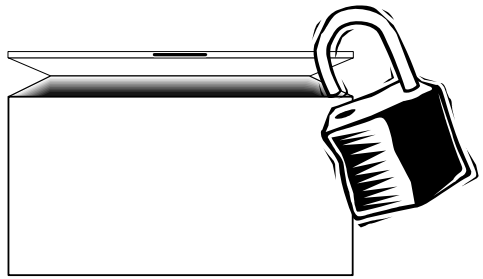
- Agent
  - What do we consider HCPTs?
  - Viable? Whole organism or DNA?
- Quantity
  - Any amount can be significant
  - A threshold amount for toxins
- Form
  - Repository stocks, working samples, in host, contamination
- Detail—what level is adequate for MC&A?
  - Material as *items*
  - Each vial as a separate inventory record?
- Capture—when does MC&A start & stop?
  - Naturally occurring; clinical samples; disposition
- Other Issues?
  - Uniformity: government/ commercial/ academic/ other owner
  - Future: genetic engineering, chimeras, synthetic bugs

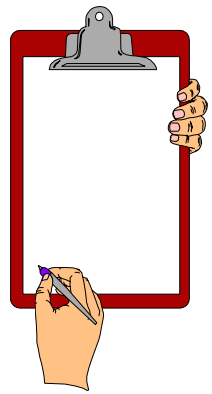
Information about "material" is needed for control and accountability.

- **Attributes**: to characterize the material ("what")
  - Agent / strain
  - Origin
  - Date
- **Description**: to identify a particular *item* of the material ("which")
  - Container
  - Identification
  - Location
- **Type or classification**: to assign biosecurity significance ("why")
  - Group



Material Control and Accountability



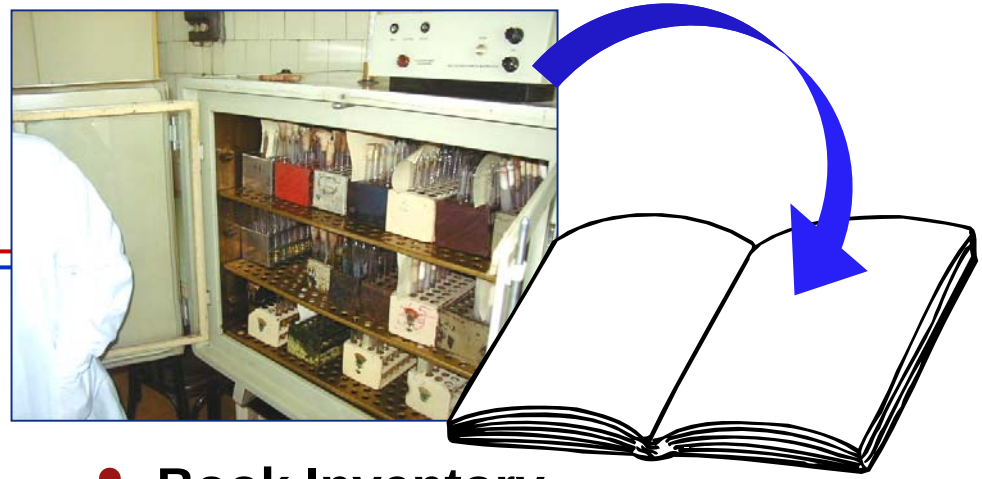


- Control is either…
  - Engineered / Physical
  - Administrative
- Containment is part of material control
  - Containment Lab / Freezer / Ampoule
- Procedures are essential for material control
  - For all normal conditions:
    - Storage
    - Use
    - Changes: creation, modification, destruction
  - Must also deal with abnormal conditions:
    - Inventory discrepancies, anomalies, accidents

Material Control and Accountability

- All material should have an associated "accountable person"
  - The person best in a position to answer questions about the associated material
  - Not someone to blame!
  - Ensure that no material is "orphaned"
- Procedures ensure accountability
  - Experimental work: laboratory procedures
  - Inventory: know what you have
  - Reporting: document routine MC&A practices
  - Audit/ assessment: is this working?
    - Ensures effective *implementation* of MC&A
  - Training: personnel understand requirements

Inventory



- Physical Inventory
  - The actual state of the material inventory
  - Based upon an inventory *taking*
  - Performed periodically
- Book Inventory
  - What we think is the material inventory
  - Based upon our information record
  - Maintained continuously

- Need to compare the book inventory with the physical inventory and reconcile any discrepancies
- Book inventory now an issue for *information* security:
  - ***Who*** needs to know? Who needs to know ***what?***

Benefits

MC&A:

- **Prevents, or makes more difficult, some easy material diversion scenarios**
- **Documents lab status *before* any problems occur**
  - **Better than forensic work *afterwards***
- **Is consistent with and reinforces good laboratory practice**

Much of MC&A is likely already done for reasons other than biosecurity…

- ***Biosafety***
- ***Good research practice***
- ***Business interest***

Challenges

We want to *avoid*…

- Implementing poor MC&A measures
  - Those that are ineffective and unnecessary
- Making “real work” more burdensome
- Imposing unacceptable costs
  - Time
  - Money
  - Effort
- Spreading knowledge of inventory information

Questions that material control and accountability must satisfy:

- **Does it accomplish its intended purpose (improved biosecurity)?**
- **Is it free of serious *unintended* consequences?**
- **Are the tradeoffs worthwhile, or are they too difficult?**

The success of MC&A …

… depends on <u>what</u> we do, and <u>how</u> we do it:

Implementation!

Summary

- MC&A is an important component of biosecurity
  - Complements other measures
  - Applies to the materials of concern
    - Containment
    - Procedures
    - Accountability
  - MC&A for biosecurity is ***not*** the same as MC&A for nuclear materials
- MC&A can improve biosecurity, but presents challenges
  - Effective implementation is key